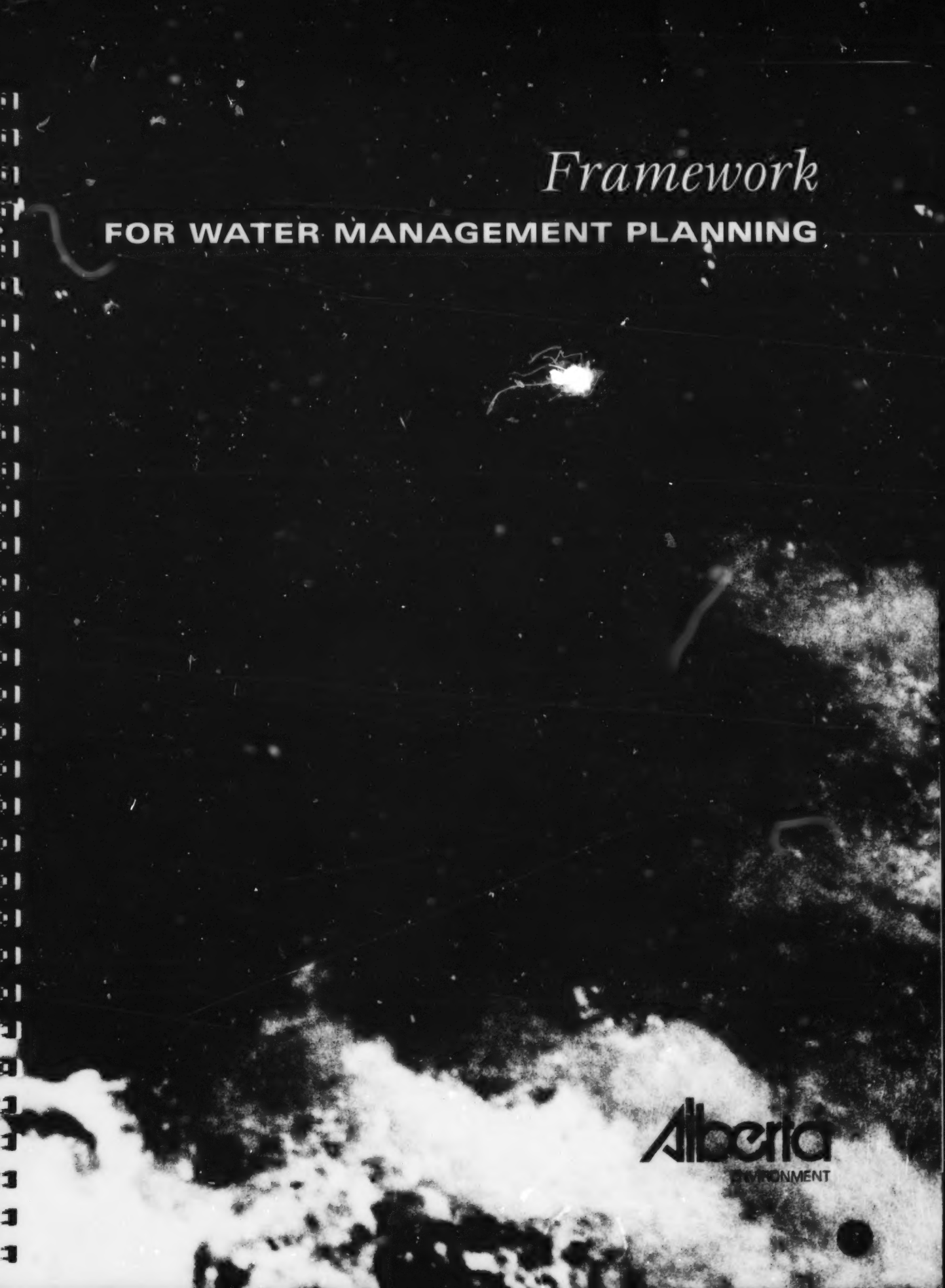
Framework

FOR WATER MANAGEMENT PLANNING



Alberta
ENVIRONMENT

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Message from the Minister

As our economy continues to flourish and our population explodes, effective water management will be essential for ensuring reliable water quantity and quality. The Alberta Advantage has always been about striking the right balance between a sustainable environment and the economic and social well being of Albertans. There is absolutely no doubt that we face some major challenges in the years to come as the uses and users of water are often at odds.

These inter-relationships must be recognized in planning. It is a task for all of us to ensure a suitable water management system is in place for the protection and benefit of all Albertans.

The *Framework for Water Management Planning* outlines the planning direction for water throughout the province. It is intended to provide consistent direction, while at the same time allowing for enough flexibility to address different situations. The *Framework for Water Management Planning* supports sustainable resource and environmental management, recognizes both short- and long-term needs and values for water, and considers local and regional perspectives.

Central to it is the *Strategy for the Protection of the Aquatic Environment*. This Strategy affirms government's commitment to not only maintaining and restoring the aquatic ecosystem but also enhancing it.

The Government of Alberta is committed to making resource decisions within the context of this Strategy. All Albertans share the responsibility to ensure that a resilient and healthy aquatic environment is sustained for present and future generations.

This framework is the cornerstone for water management planning that will ensure Alberta continues to be the very best place to live, work and play well into the century.

Lorne Taylor

Lorne Taylor
Minister of Environment

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"The Framework for Water Management Planning *supports sustainable resource and environmental management, recognizes both short- and long-term needs and values for water, and considers local and regional perspectives."*

Lorne Taylor, PH.D
Minister of Environment

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Background

During the 1990s, guided by extensive public consultation, Alberta Environment reviewed water management policies and legislation. The goal was to establish a blueprint for the sustainable management of water in Alberta. By listening to Albertans, a vision and principles for sustainable water management were developed. New policies to guide water management were adopted by government. A comprehensive new statute, the *Water Act*, was created and is now in effect, providing legislative authority for the implementation of these policies.

Throughout the review process, Albertans made it clear that government needed to ensure sustainable water management and a healthy aquatic environment. The government agreed that effective and efficient water management planning is essential and made a commitment through Part 2, Division 1 of the *Water Act* to develop a document to guide such planning called *The Framework for Water Management Planning (Framework)*. A major component of the Framework and a requirement of the *Water Act* is the *Strategy for the Protection of the Aquatic Environment (Strategy)*. The Strategy details the government's commitment to maintaining, restoring or enhancing the condition of the aquatic environment. Both the Framework and Strategy are presented in this document.

Intent of the Framework for Water Management Planning

Water management planning has been practiced in the province for many years. However, after listening to Albertans, it was clear government needed to formalize the process. The *Framework for Water Management Planning* tries not to reinvent the wheel but reflects successes from past experience while introducing innovative requirements based on an increased understanding of the complexity of the environment and the challenges of the future. The Framework outlines the process for water management planning and the components required for water management plans in the province. It applies to all types of waterbodies, including streams, rivers, lakes, aquifers and wetlands, and takes a holistic approach. The Framework recognizes that no two situations are exactly alike and therefore is not intended to be a detailed user's manual on how to prepare water management plans. Rather, it is meant to provide general guidance for the planning process.

A water management plan can be developed by anyone. It can be a single issue such as a lake cleanup or involve multiple issues in a major river basin. However, any person developing a water management plan must follow the *Framework for Water Management Planning*.

The *Framework for Water Management Planning* will be reviewed every five years to make sure it remains current and continues to support sustainable water management.

Sustainable Resource and Environmental Management

The *Framework for Water Management Planning* has been designed to be consistent with the document *Alberta's Commitment to Sustainable Resource and Environmental Management.*

This commitment to sustainable development outlines a shared vision, provides provincial direction and highlights the importance of effective and up-to-date decision-making and regulatory processes.

Integrated Resource Management (IRM), the interdisciplinary and comprehensive approach to decision-making, is the method by which this commitment will be achieved. The Framework is consistent with these principles.

IRM incorporates decisions, legislation, policies, programs and activities across resource sectors to gain the best overall long-term benefits for society and the environment and to minimize conflicts. This approach recognizes the inter-relationships between resources. For example, one can't contemplate agricultural land use without also considering its effects on water quality. A water management plan must also consider its effects on present and future agricultural use such as irrigation in the planning area.

The Framework recognizes the linkages between water management planning and planning that occurs for other resources. It is critical that water management planning and decision-making be integrated with other planning initiatives and decision-making for other resources such as forests, fish, wildlife, petroleum, minerals and public and private lands. Where appropriate, water management plans will support existing Regional Strategies.

Such Regional Strategies will define goals and address issues that cover the full range of air, water and public land resources. Regional Strategies, developed in collaboration with stakeholders and affected communities, will guide planning within each region. Partnerships between resource managers will provide for the exchange of information and a better understanding of how decisions made for one resource can impact others.

Integrated resource management is based on the following principles:

Natural resource management decision-making will consider the full range of environmental, social, health and economic interests and values and integrate their management into an effective whole.

IRM will be future oriented. It will attempt to anticipate natural resource management issues and needs to provide a more predictable context for those who wish to use or enjoy Alberta's natural resources.

Management will also be adaptive, responding to experience, new information, shifts in social preference, technological innovations and unexpected situations.

Those affected by decisions will be consulted before action is taken. Open communication will be supported.

Decision-making processes will be fair and will provide public access to relevant information.

Decision-making will be based on understanding the potential consequences of choices.

Decision-making processes will strive for efficient use of time and financial resources. Decisions should contribute to achieving the government's goals and objectives.

Lines of accountability for processes, products and implementation must be clear. Decision-makers will be accountable for their decisions.

Products and processes will be straightforward, not open to a wide range of interpretations. Roles and responsibilities will be well defined.

1.4 Strategy for the Protection of the Aquatic Environment

The *Water Act* requires that a *Strategy for the Protection of the Aquatic Environment (Strategy)* be established as part of the *Framework for Water Management Planning* for the province. The Strategy is an intrinsic part of water management planning and must be considered within all resource planning activities that may affect the aquatic environment.

The aquatic environment can be defined in terms of water quantity, water quality, habitat and aquatic species. Protection of the aquatic environment will be achieved through the active management and regulation of activities and water uses that affect these four elements.

Objectives for the protection of the aquatic environment must be understood and considered in the development of any water management plans or other resource planning activities.

The aquatic environment is part of a complex and interconnected natural system. Cooperation between water managers and users and managers of other natural resources is therefore essential for the protection of the aquatic environment. Alberta Environment works cooperatively with other provincial government departments, other governments and the public to ensure an integrated resource management approach that supports the protection of the aquatic environment.

The government has the responsibility for the approval and adoption of water management plans and decisions under the Water Act.

All Albertans are stewards of Alberta's water.

Water management planning is a process that addresses multiple issues, involves stakeholders, and produces resource management recommendations. These recommendations can be used by any resource decision-maker when their decision could impact water quantity, quality, habitat or species. Individually authorized terms of reference will ensure that the planning process is followed and all required components of a water management planning initiative are adequately addressed. All future water management planning must adhere to the concepts provided in this section of the Framework. This will ensure a consistent approach to water management planning in Alberta.

Vision and Principles

2.1

The vision and principles were developed during the review process that created the *Water Act*. The visions and principles were developed through consultation with Albertans and have been adopted by the Government of Alberta. The vision and principles guide water management planning.

Vision

- *All Albertans are stewards of Alberta's water;*
- *Albertans act responsibly in managing and conserving water, to ensure the environmental, economic and social health of the province; and*
- *Albertans recognize the importance of living within the capacity of the natural environment as a means of ensuring the sustainability of water.*

Water Management Principles

- Water must be managed sustainably.
  - ➥ *Water must be managed and conserved to meet current and evolving needs without compromising the ability of future generations to meet their own needs.*
- Water is a vital component of the environment.
  - ➥ *Water is recognized as one of Alberta's most important natural assets; and*
  - ➥ *the aquatic environment, including the diversity of aquatic life, must be protected.*
- Water plays an essential role in a prosperous economy and balanced economic development.
  - ➥ *Water must be wisely allocated and efficiently used, and regulatory and administrative processes for managing water must be streamlined, user-friendly and fair.*
- Water must be managed using an integrated approach with other natural resources.
  - ➥ *The interdependence of water quality and water quantity is recognized;*
  - ➥ *the interdependence of natural resources is recognized; and*
  - ➥ *water management is based on a watershed approach.*
- Water must be managed in consultation with the public.
  - ➥ *The public must be involved in water management and decision-making;*
  - ➥ *information sharing and open communication must be provided for; and*
  - ➥ *opportunities for public education must be supported.*
- Water must be managed and conserved in a fair and efficient manner.
  - ➥ *Water rights which existed under the* Water Resources Act *must be recognized;*
  - ➥ *enforcement action when required must be applied firmly, fairly and consistently;*
  - ➥ *water management must respond to differing local and regional needs; and*
  - ➥ *the Government of Alberta must work cooperatively with governments of other jurisdictions.*

Integrated resource planning is directed through provincial legislation such as the *Water Act, Environmental Protection and Enhancement Act, Forests Act,* and the *Municipal Government Act.* Planning conducted under these acts, as well as resource planning and decision-making under the *Public Lands Act,* needs to be done in an integrated manner because of impacts one resource may have on another.

In some cases water and other resource management objectives are not compatible. Therefore, water management planners must work closely with other resource planners, and vice-versa, to ensure that resource management objectives are identified and understood, and potential conflicts are resolved. Where required, various resource planners should seek to work together to achieve mutual goals. For example, flood damage reduction and public safety objectives in a water management plan under the *Water Act* support municipal planning by identifying areas at risk through floodplain mapping. In turn, land development restrictions within the floodplain, as part of a municipal plan under the *Municipal Government Act,* support the flood damage reduction and public safety objectives under the water management plan.

Government's Role

The government has the responsibility for the approval and adoption of water management plans and decisions under the *Water Act.* Alberta Environment will continue to play a lead role by creating, coordinating, authorizing and approving water management plans. Other government, non-government organizations or stakeholder groups may also develop water management plans. For example, a lake management society could initiate a water management plan. This plan would be created in collaboration with government, ensuring through the review and authoriziation of the Terms of Reference, that the proposed scope of planning, level of stakeholder involvement and objectives are sufficient to achieve the intended results and are consistent with the *Framework for Water Management Planning.*

By committing to sustainable resource and environmental management, the government has made it clear that all Albertans share responsibility for water management. Other governments, industry and members of the general public will play a role in water management planning activities. The government will ensure that the level of consultation will be appropriate.

Scope of Planning for Water Management

The scope of planning relates to the geographic limits of the planning area as well as to the breadth of issues and information considered. Water management planning is most effective when it considers all areas likely to affect or be affected by the plan. Therefore, geographic limits for water management planning areas will normally be watershed boundaries rather than boundaries such as cities or local authorities.

A watershed is an area from which all water flows to a common location. Watershed shapes and sizes vary. A watershed may feed to a lake, wetland, creek or river. The largest watershed level is a major river basin, of which Alberta has seven. Each major river basin is made up of smaller watersheds that contribute to it. Water management planning in a sub-basin must consider implications to the major basin. Commitments or objectives resulting from a planning process in a sub-basin should not adversely affect other sub-basins or the major basin. The following are some instances where the larger watershed should be considered when developing a water management plan for a sub-basin or even an individual waterbody:

- a plan for the larger basin does not exist;
- allocation for water within the basin is considered to be close to acceptable limits;
- there are conflicting interests that must be considered; and
- protection of the aquatic environment needs to be achieved on a larger scale.

There will be instances where planning areas will vary from watershed boundaries. Aquifers and the areas that feed into them do not necessarily reflect surface watershed boundaries and will therefore require a different type of planning boundary. However planning will still need to be done in the context of sustainable objectives in the larger basin or basins in which the aquifer is located.

Water management planning can address a broad range of issues at a variety of magnitude or may involve just a single issue. For example, a group of local stakeholders may work with government to address a flooding problem in their area. Planning can also be done when a more comprehensive approach is needed to address a number of issues. An example is the development of a basin plan for a river, which considers multiple issues such as water supply, water quality, fish habitat needs, aesthetics and recreational use.

Planning Priorities

Local or regional planning priorities must be developed in consultation with the public. Provincial priorities for planning will consider regional and local input. The criteria for determining which planning initiatives are to be undertaken and their priority include the following:

Pressure on the Resource

- What are the present and anticipated demands for water?
- What are the current and projected issues in terms of water quantity, quality, aquatic and riparian (bank or shoreline) habitat and species?
- What is the extent or impact of the pressure:
  - long term or short term;
  - local or regional; or
  - isolated or cumulative?

Public Concern

- Are there human health concerns?
- Are there environmental, economic or social concerns?
- Are the concerns international, national, provincial, regional or local?
- How urgent are these concerns?

Relationship with other Resources and Initiatives

- Are there other related resource issues?
- Are there other related resource commitments?

In addition to the above criteria, there may be advantages to conducting water management planning at the same time as other planning initiatives. Regional Strategies will provide a level of integrated resource management that outlines shared planning opportunities. Such joint planning would mean the simultaneous development of more than one type of plan, sharing a common planning area or sharing a public consultation process. For example, a Water Management Plan may be developed in conjunction with a Forest Management Plan or a Municipal Plan.

The most significant difference between a Water Management Plan and an Approved Water Management Plan is that the latter requires an approval by the Lieutenant Governor in Council or by the minister if authorized by the Lieutenant Governor in Council.

The following section describes the different types of outcomes and provides guidance for the selection of the most appropriate to address the intended purpose. The water management planning process can result in: a Water Management Plan, an Approved Water Management Plan or a Water Conservation Objective. These results of planning must be consistent with the *Water Act* and other legislation, regulations and policies. Resource decision-makers can use these outcomes when making decisions that may impact water.

At the terms of reference stage (detailed in section 4.2), an Alberta Environment Director responsible for water management for that area of the province will make the final determination of what type of plan is appropriate. The Director may also determine that no plan is needed. Among the considerations is the scope or special characteristics of the area affected as well as obligations under the *Water Act*.

3.1 Water Management Plans

Water Management Plans provide broad guidance for water management, set out clear and strategic directions regarding how water should be managed or result in specific actions.

The *Framework for Water Management Planning* requires that a Water Management Plan must include the following:

- a summary of the issues considered;
- a description of the area in which the Water Management Plan applies;
- a summary of the information assembled as part of the planning process;
- the relationship of the Water Management Plan to regional strategies or other planning initiatives;
- the recommended options and strategies to address the issues; and
- a list of performance monitoring requirements.

The Water Management Plan may also contain any other matters and factors deemed relevant by the Director through the authorization of the Terms of Reference (see section 4.2 *Terms of Reference*).

The Director(s) responsible for water management for that area of the province may authorize a water management plan.

A Water Management Plan should be considered by Alberta Environment when making day-to-day decisions within the physical area that the plan covers.

3.2 Approved Water Management Plans

The most significant difference between a Water Management Plan and an Approved Water Management Plan is that the latter requires - according to the *Water Act* - an approval by the Lieutenant Governor in Council or by the minister if authorized by the Lieutenant Governor in Council.

According to the *Water Act,* if an Approved Water Management Plan exists, it must be considered when making licence and approval decisions.

An Approved Water Management Plan is required:

- for transfer applications under Section 82 of the *Water Act,* or
- when - during a transfer application - a Director decides under Section 83 of the *Water Act* to hold back up to 10 per cent of the allocation.

It is important to determine if any of these items may be part of the proposed plan before any work begins. It will be easier to ensure that all the requirements of an Approved Water Management Plan are met if they are included from the beginning. It will be more difficult to convert to an Approved Water Management Plan later in the work and may require repeating some aspects of the work or consultation.

The decision regarding whether the intended outcome is applicable under this Framework is made at the Terms of Reference stage. If the outcome is a Water Management Plan or an Approved Water Management Plan, the Framework applies. If the outcome is not a water management plan, the Framework does not apply.

In addition to the requirements for a Water Management Plan and according to Section 11 of the *Water Act* an Approved Water Management Plan must include:

- a summary of the issues considered in the water management plan;
- a description of the area of the province to which all or part of the water management plan applies;
- a summary of the recommendations from the minister; and
- the matters or factors that must be considered in deciding whether;
  - ➥ to issue an approval, preliminary certificate or licence or effect a registration, or
  - ➥ to approve a transfer of an allocation of water under a licence in the area of the province to which the Approved Water Management Plan applies.

Section 11 of the *Water Act* also states that an Approved Water Management Plan may include:

- the number of households permitted on a parcel of land for the purpose of section 21 of the *Water Act*;
- authorization of ability to transfer an allocation of water under a licence;
- authorization of ability to withhold water under section 83 of the Act; and
- a provision on the maximum amount of water that may be diverted under a registration.

3.2 Water Conservation Objectives

As outlined in the *Water Act*, a Water Conservation Objective pertains to the amount and quality of water established by the Director to be necessary for the:

- protection of a natural water body or its aquatic environment, or any part of them;
- protection of tourism, recreational, transportation or waste assimilation uses of water; or
- management of fish or wildlife.

Water conservation objectives apply to man-made and natural water bodies.

Water conservation objectives may be developed in three forms:

- within an Approved Water Management Plan;
- within a Water Management Plan; or
- outside of a plan.

Section 15(1) of the *Water Act* states that the Director may establish a Water Conservation Objective. Section 15(2) of the *Act* requires the Director to engage in consultation that the Director considers appropriate during the establishment of a Water Conservation Objective.

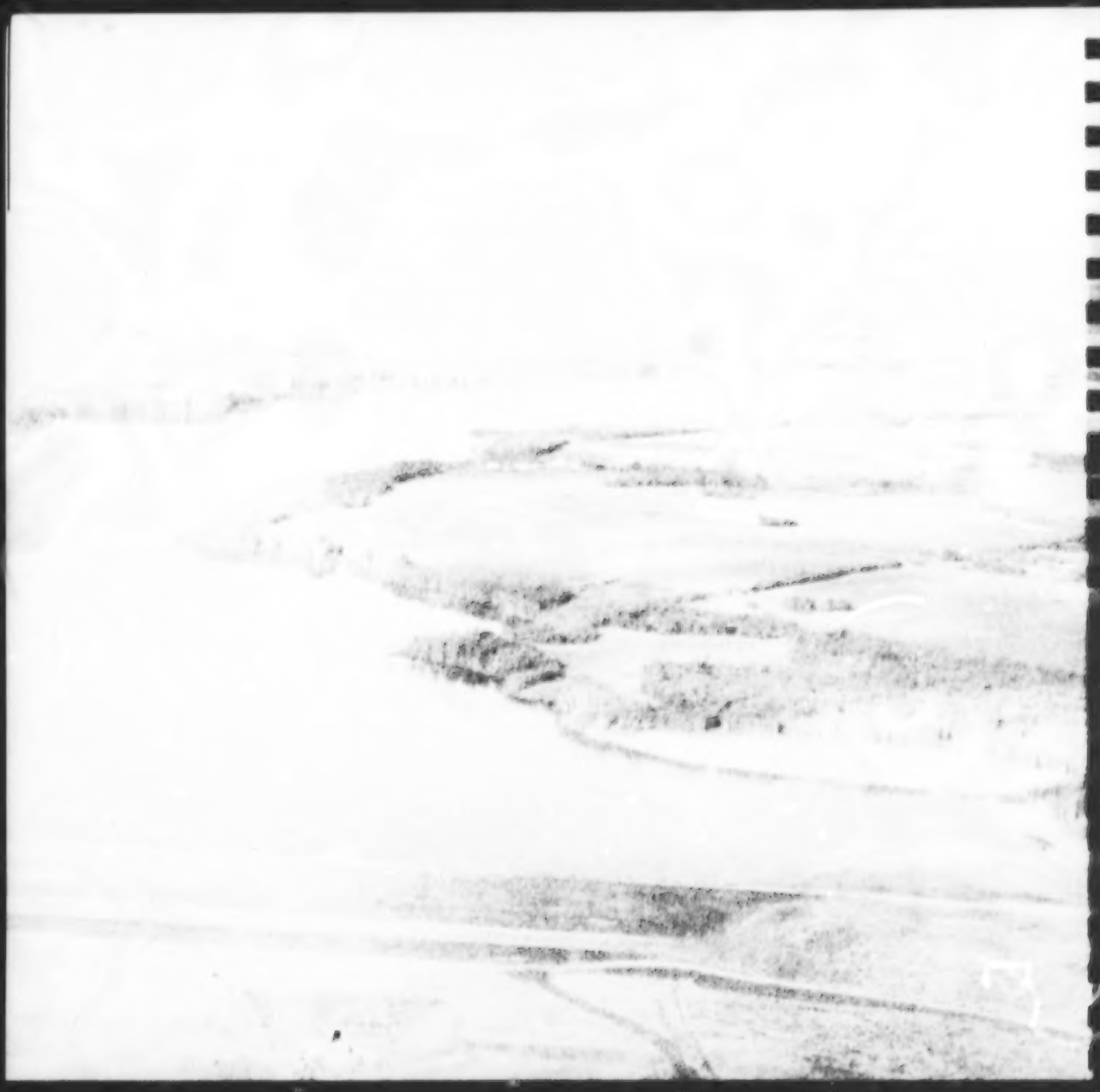
3.4 Guidance for Resource Management Decisions

As part of the planning process, it may become evident that a water management plan may not be the most practical option. Therefore, decision-making can also be made through a number of resource management tools in the *Water Act* that can be used outside of water management plans, such as Crown reservations, conditions within a licence, Crown licences, approvals for activities, guidelines and codes of practice. The decision whether or not to proceed with a water management plan will be made in consultation with the Director responsible for water management in the region.

There are other mechanisms to achieve water management by influencing activities outside the scope of the *Water Act*. The environmental assessment process, as set out in the *Environmental Protection and Enhancement Act*, provides a means of reviewing development projects to assess their potential impact on the environment. Some projects are also subject to review by agencies such as the Energy and Utilities Board or the Natural Resources Conservation Board, to determine if the project is in the public interest. Land use planning done within a municipality is another planning activity outside of the *Water Act* that can support water management. Most forestry related activities on public land are governed by a system of progressively more detailed plans including Forest Management Plans, General Development Plans, and Annual Operating Plans. Many of these plans are developed by industry and all are approved by government. Integration of planning will be achieved through Regional Strategies led by Alberta Environment.

Development of Water Management Plans, Approved Water Management Plans and Water Conservation Objectives must conform to the components in section 4.0.

During water management planning, Albertans must have an opportunity to understand the current state of the resource and provide input.



The proponent of the water management plan is responsible for ensuring that commitments to monitoring and reporting are met.

4.1 Issues Identification

An inclusive, comprehensive and forward thinking approach must be used to identify issues. It is important for full stakeholder participation at this early stage to ensure that all pertinent concerns are raised. The issues identified must be evaluated to determine their relative importance and to decide which issues the water management planning process will address. Planning process outcomes (see section 3) will be determined by the issues to be addressed. In some cases, issues may be better addressed under other planning processes, such as municipal land use planning.

4.2 Terms of Reference

While the Framework provides broad guidance for the planning process, the Terms of Reference will provide the specific details of what is to be undertaken. The Terms of Reference is prepared in consultation with stakeholders and will ensure that stakeholders are provided the opportunity to participate in the planning process.

At a minimum, the Terms of Reference must include:

- an overview of current conditions and an initial description of issues;
- a geographic description of the planning area;
- the intended objectives of the planning process;
- the roles, responsibilities and accountability of those who will be involved;
- the potential linkages with Regional Strategies;
- the proposed public consultation process;
- a work plan;
- information requirements; and
- a proposed schedule for the planning process.

Authorization of the Terms of Reference is required from the Director(s) responsible for water management for that area of the province. It is at this stage that a decision is made regarding the intended outcome of the planning process. The Director will decide whether it is appropriate to proceed with a Water Management Plan, an Approved Water Management Plan, a Water Conservation Objective or other tools under the *Water Act*. It may be decided that the proposed work is not a water management plan and therefore the *Framework for Water Management Planning* does not apply. The decision will be made based on the relevance of the issue to water management as well as on *Water Act* requirements.

4.3 Public Consultation

As outlined in the water management principles, public consultation is essential to the planning exercise. During water management planning, Albertans must have an opportunity to understand the current state of the resource and provide input. Therefore, the process by which public consultation will occur needs to be clearly identified in the Terms of Reference to ensure that communication is open and information is shared. Public participation will range from providing information to formulating recommendations. Opportunities for active public involvement in the planning process can include membership on study management and advisory committees, participation in joint problem solving workshops or consensus building forums.

As a minimum, the public consultation component for a water management plan must include:

- the objective of public consultation;
- a description of previous consultation outcomes;
- a list of key individuals and groups;
- a description of how public involvement fits into the planning process; and
- a communication strategy.

4.4 Planning Area

The boundaries of the planning area must be identified and the extent of the planning area finalized. The selection of the water management planning area must be consistent with section 2.3 *Scope of Planning for Water Management*. The planning area should have been identified in preliminary work from section 2.3. It is important that all stakeholders have a common understanding of the extent of the planning area.

Collection of Information

Once the planning area has been identified, information requirements relevant to the issues to be addressed can be identified and data can be collected. Information could include water quantity, water quality, current and projected demands on the resource, existing commitments on the flow regime, the physical habitat characteristics of the waterbody and the aquatic species and plants present. The range of existing conditions, including current and proposed land uses, should be considered. A compilation of policies, legislation, existing plans and commitments, and other relevant documents is required. Roles of the individuals or organizations responsible for gathering the information must be confirmed.

At any time in the planning process, gaps in information may be discovered. Apart from identifying them, the methods of obtaining the required information must also be noted. As well, it must also be determined whether additional data is of value, how to get it, how much it will cost and who will pay for it.

All information brought to the planning process will be part of the public record and subject to the provisions of the *Freedom of Information and Protection of Privacy Act*. The Director may need to defend his decision so the information on which his decision is based must be publicly available.

Recommendations for Addressing the Issues

All information collected must be carefully evaluated. Options should be developed to address identified issues. The mechanisms and resources required to implement each option must be explained. The benefits and consequences of the various options must also be identified.

4.7 Performance Monitoring

Targets set within the plan may take years to achieve. Performance monitoring allows resource managers to check progress and to confirm results. It also allows resource managers to adapt to unexpected results during the implementation of the plan. If the expected results are not achieved, adjustments will be made as required.

The performance monitoring component must identify:

- indicators to be used to measure the success of the plan;
- target values and variability of these indicators;
- monitoring required to measure the indicators;
- agencies or work units that are responsible for the monitoring; and
- mechanisms to be used to report results to those responsible for taking action.

The proponent of the Water Management Plan is responsible for ensuring that commitments to monitoring and reporting are met.

4.8 Documentation

All components of the Water Management Plan must be documented and publicly available. The final document must contain clearly stated recommendations. These recommendations will be considered by decision-makers under the *Water Act* and other pertinent legislation. The expectations for licensees, approval holders and others will be clearly defined.

Approval

Approvals are required at two times in the planning process. The first approval required is the authorization of the Terms of Reference. The second approval is for the outcome of the planning process, be it a Water Management Plan, an Approved Water Management Plan or Water Conservation Objective.

Section 11 of the *Water Act* states that the Lieutenant Governor in Council or the Minister, if authorized by the Lieutenant Governor in Council, may approve a Water Management Plan. A Water Management Plan approved by the Lieutenant Governor in Council or the Minister under this section is referred to as an Approved Water Management Plan.

According to the Framework, the Director(s) responsible for water management for that area of the province may authorize a Water Management Plan.

A Water Conservation Objective, whether stand-alone, part of a Water Management Plan or part of an Approved Water Management Plan, may also be established by the Director.

Review and Amendment

An important final component of a Water Management Plan is a schedule for review. This component will outline when the plan will be revisited and how appropriate adjustments will be implemented. The Water Management Plan may require revisiting to ensure that the plan remains relevant and reflects current objectives.

It is the role of the proponent of the Water Management Plan to ensure that reviews are completed and that water management plans and water Conservation Objectives are amended as appropriate. As stipulated in section 12 of the *Water Act*, any substantive changes to an Approved Water Management Plan will require approval from the Lieutenant Governor in Council or the Minister, if authorized by the Lieutenant Governor in Council.

5.0 *Strategy for the Protection of the Aquatic Environment*

The *Strategy for the Protection of the Aquatic Environment (Strategy)* represents an integrated approach to water management in the province. Central to this approach is the recognition that the environment is a complex natural system, all parts of which are interconnected. Because of their interconnection, air, land and water issues must be considered together. Therefore, the Strategy applies to all activities and decision-making that could effect the aquatic environment. This is consistent with *Alberta's Commitment to Sustainable Resource and Environmental Management.*

Albertans depend on the province's water resource for many different purposes. A clean, abundant supply of water is necessary for uses such as drinking, swimming, irrigation, industrial processes and the generation of electricity. The province's rivers, lakes, riparian (bank or shoreline) areas and wetlands are also important for recreational uses and as an aesthetic resource, providing enjoyment for thousands of people each year. Water bodies and the lands that surround them also serve as important habitat for a great variety of animals and plants. In fact, aquatic and riparian ecosystems support the greatest 'biological diversity' of all types of ecosystems.

The *Water Act* upholds existing commitments to water users, while including provisions that promote water conservation, protect water quality and allow more flexible water management. Fundamental to the *Water Act* is the recognition that the protection of the aquatic environment is essential sustainable water management. The Strategy, required by the Act, confirms the government's commitment to maintaining, restoring, or enhancing current conditions in the aquatic environment throughout the province. The protection of the aquatic environment is an underlying principle for managing natural resources in Alberta.

5.2 The Aquatic Environment

The aquatic environment is a complex system that is influenced by many factors such as climate, weather patterns, landscape and geology. It includes naturally occurring features, such as rivers, streams, creeks, riparian areas, lakes, wetlands and groundwater. Each water body is associated with a unique variety of plant and animal life as well as a riparian area. The state of the aquatic environment throughout the province is naturally variable. Swift moving, cold mountain streams support a different community of plants and animals than slower moving, warm, prairie rivers. Conditions in the large, deep lakes of northern Alberta are different than those in the smaller, shallow lakes in central and southern parts of the province. Natural conditions also vary from season to season and from year to year.

The influence of human activity is reflected in the condition of some of the province's waterbodies. Alberta's major river systems are impacted to varying degrees by municipal, industrial and agricultural development. The quality of some Alberta lakes, particularly those in central and southern parts of the province, has declined due to human activity. Wetlands have been lost from many of the settled parts of the province.

The aquatic environment can be viewed in terms of four inter-related elements, each of which is subject to human influence. These elements are:

- the amount of water available or **water quantity**;
- the chemical, microbiological and physical characteristics of the water or **water quality**;
- the physical and biological structure of the water body and the land surrounding it or **habitat**; and
- the plants and animals living in or associated with water bodies, wetlands and riparian areas or **aquatic species**.

By managing activities that affect these four elements we are able to protect the aquatic environment.

Alberta's Commitment to the Protection of the Aquatic Environment

The Government of Alberta is committed to protecting the aquatic environment, now and in the future.

Protection of the aquatic environment is a shared responsibility of Albertans and all governments. The overall objective is to be responsible stewards of the ecosystem. The actions taken to protect the aquatic environment will be determined by current conditions, desired outcomes and a variety of constraints, including the existing commitments to water users. In some cases, objectives for the protection of the aquatic environment will be achieved through mitigation.

Protection will occur through maintaining, restoring or enhancing current conditions.

Maintenance of existing conditions is a key part of the government's commitment to protection of the aquatic environment. It is easier and less costly to protect existing resources from degradation than to restore them after they have deteriorated. For example, municipalities and industries have limits for effluent releases in their *Environmental Protection and Enhancement Act* approvals. These limits help to maintain water quality within an acceptable range.

The *Water Act* provides legislative tools to help maintain the aquatic environment through conditions in new approvals or licences and by ensuring compliance with conditions of existing approvals and licences. The Act also provides the Director with the ability to decide that no further applications for water allocation or certain activities will be accepted.

Where the aquatic environment is stressed beyond its natural limits, it may be both desirable and feasible to change conditions to what existed before. An example of a restoration program is the Alberta Riparian Habitat Management Program, known as "Cows and Fish," which helps ranchers to modify livestock grazing practices in areas bordering streams and rivers. The program has restored these riparian areas, which has led to improved riparian habitat, better water quality and improved range conditions for the cattle producer.

The *Water Act* has a provision to hold back up to ten per cent of the water allocation that is being transferred under a licence. The "hold back" can be used to restore water levels or flows.

It may be appropriate to alter natural conditions to maximize the potential of the aquatic environment to support certain activities. Such improvements are based on human values or needs. An example of enhancement is the aeration of sport fishing lakes to prevent fish kills. Fish kills can occur naturally due to low dissolved oxygen concentrations in lakes during winter. Aeration increases dissolved oxygen concentrations to enhance fish survival, thereby improving the sport fishing potential for the next year.

The *Water Act* enables the enhancement of the aquatic environment through a licence to divert water to create a wetland for waterfowl habitat. An approval to construct instream works that enhance aquatic habitat is also possible under the Act.

Setting Priorities for the Protection of the Aquatic Environment

The Government of Alberta recognizes the need to be proactive and react quickly and effectively to protect the aquatic environment. Highest priority will be given to those water bodies where present or future ecological integrity is at greatest risk or where the greatest benefits of preventative or mitigative actions can be achieved. Measures of ecological conditions such as water quality, number of species at risk, habitat quality, species distribution and population trends can serve as indicators of ecological integrity. These indicators can be used as criteria for determining priorities for protection. Setting priorities is part of the planning process; details are provided in section 2.4 *Planning Priorities.*

Implementation of the Strategy 5.4

Objectives are required to provide clear direction for the protection of the aquatic environment. A good understanding of the aquatic environment will help define these objectives and evaluate the success of protective measures to achieve them. There are a variety of tools and methods for achieving protection of the aquatic environment in Alberta. Table 1 lists examples of the accepted practices and legislative options available.

Objectives for Protection

The province has established numerous objectives that provide guidance for protecting the aquatic environment. Objectives may be expressed as numerical limits such as in the *Surface Water Quality Guidelines for Use in Alberta,* which specifies water quality guidelines for the protection of various water uses. Objectives may also be expressed narratively, as in the case of the criteria for habitat development.

Specific objectives may need to be set based on knowledge and understanding of the aquatic environment, as well as on expectations for a defined area. For example, the need to specify the rate and quality of flow for fish habitat for a particular stream may lead to the establishment of a Water Conservation Objective. Once established, site specific objectives will be useful in choosing the appropriate water management tools to meet the objectives. An example of such a tool is a condition in a licence that supports an instream objective. Objectives can be set at a range of scales, from individual lakes or river reaches to the larger basin or province-wide.

Knowledge and Understanding

Selection of appropriate protective measures requires knowledge of the status of the aquatic environment in terms of water quantity, quality, habitat, and species, including how these elements interact and what factors affect them. The consequences of individual and cumulative resource management decisions must also be understood. Resource decision-makers should:

- incorporate new information as it comes to light through research and monitoring efforts, or from experience elsewhere;
- encourage the use of innovative solutions to traditional problems; and
- continually modify management practices based upon the results of experience.

DATA

Either solely or in partnership with industry, non-government organizations, other agencies or stakeholders, the government currently measures and assesses conditions in the aquatic environment through a variety of monitoring and inventory programs. These programs provide important baseline and long-term trend information. Management approaches can be adjusted as necessary based on monitoring data. Monitoring activities in which the government is currently involved include:

- measurement of river flows and lake water levels;
- water quality monitoring, including impact assessments;
- waterfowl and wetland surveys;
- aquatic and semi-aquatic species population and habitat inventories;
- fish and fish habitat inventories; and
- creel census and resource utilization surveys.

The need for monitoring and inventory programs in Alberta is increasing due to a strong economy and prosperity in the province. Government will meet this significant challenge through continued data collection, monitoring and assessment as well as through continued collaboration and partnerships.

Information collected about the aquatic environment needs to be organized and managed effectively. The government currently maintains extensive databases containing information regarding various aspects of the aquatic environment in Alberta. The government will ensure that:

- databases contain relevant data and are current;
- government databases are compatible with databases developed and maintained by other organizations and jurisdictions; and
- information is openly and easily accessible.

The province is committed to the development and use of accurate, cost effective methods for analyzing and interpreting data. A variety of tools are used for determining conditions required to protect the aquatic environment and for predicting potential outcomes of management options. The following are some examples:

- instream needs methodologies;
- water yield, water quality and flow modeling;
- riparian health assessment; and
- compliance assessments.

These methods are being refined continuously. The government uses opportunities to learn from other jurisdictions that have faced similar issues.

The government supports research through collaboration and partnerships with universities, the private sector and intergovernmental agencies. Research priorities for the aquatic environment include:

- increasing knowledge of aquatic ecosystem structure and function;
- understanding the processes which connect air, land, and water;
- developing and refining appropriate criteria and indicators for measuring the ecological integrity of the aquatic environment;
- understanding natural variability in the aquatic environment and the factors that influence variability;
- assessing of cumulative effects of human activities on the aquatic environment; and
- understanding of impacts of climate change.

Achieving Protection

The Government of Alberta is committed to continued efforts to protect the aquatic environment through a variety of means:

- education and voluntary action;
- legislation and policy;
- conditions on disposition of public resources;
- compliance assessment and enforcement;
- physical works to maintain, restore or enhance the aquatic environment; and
- collaborative processes and partnerships.

Approaches that can be used to achieve protection are discussed below. The ecological integrity of the aquatic environment can be protected through the effective management of water quantity, water quality, habitat and species.

WATER QUANTITY

Water withdrawals may reduce flows in rivers and water levels in lakes and wetlands to a point where fish and other aquatic organisms are adversely affected. The challenge will be to balance the water that is needed to protect the aquatic environment with water needed to protect rights granted through licences under the *Water Act*. Water quantity requirements for the protection of the aquatic environment will be balanced in decision-making and planning initiatives under the *Water Act*, including approvals and licences, water conservation objectives and water management plans.

WATER QUALITY

Water quality is influenced by changes to water quantity as well as by point source or non-point source inputs. Point sources can be controlled directly. Limiting discharges to achieve water quality objectives for the protection of the aquatic environment is accomplished through *Environmental Protection and Enhancement Act* approvals. There are a number of collaborations between industry and government to reduce industrial pollution below current regulatory limits. Partners include federal, provincial and municipal governments and industry across the province.

Legislation, regulations, codes of practice and ground rules minimize the effect that land use activities have on water quality. For example, public land can be managed to reduce impacts on water quality through the *Public Lands Act*, *Provincial Parks Act*, and the *Wilderness Areas, Ecological Reserves and Natural Areas Act*. The *Forests Act* aids in the management of non-point source impacts from forestry practices through the approval of Detailed Forest Management Plans and Annual Operating Plans. The *Municipal Government Act* provides municipalities with the authority to regulate management of private land to control non-point sources. Alberta Agriculture Food and Rural Development's *Code of Practice for Responsible Livestock Development and Manure Management* sets standards for farming practices to protect groundwater and surface water.

Industrial, agricultural, and urban development may alter drainage basin characteristics, stream or lake habitat and riparian vegetation. Habitat can be maintained by mitigating the effect of potentially disruptive land practices using many of the methods discussed previously. Where fish habitat loss is unavoidable, the "no net loss" working guideline, described in the *Fish Conservation Strategy for Alberta 2000-2005*, will be followed to provide habitat replacement or enhancement at another location.

As well, the *Fisheries Act (Canada)* prohibits the harmful alteration, disruption or destruction of fish habitat, unless allowed by an authorization. Conditions placed on authorizations allowing the harmful alteration, disruption or destruction of fish habitat are intended to compensate for any habitat loss resulting from an activity and meet, at a minimum, the Department of Fisheries and Oceans' "no net loss" guiding principle.

Management of water quantity, quality, and habitat will help to protect aquatic species. Other regulatory tools apply more directly to management and sustainable use of aquatic populations. Alberta Sustainable Resource Development regulates domestic, recreational and commercial fishing using the Alberta Fishery Regulations under the *Fisheries Act (Canada)*. The regulations specify licensing requirements and set species, catch, size and gear limits for domestic, recreational and commercial fishing. Industrial roads and seismic lines can increase accessibility to fish-bearing lakes and streams, increasing fishing pressure on fish stocks. Access management, implemented through land use policies and regulations, can help to control pressure on fish and other aquatic species. Use of each of these public resources is governed by its own regulatory regime. Protection of wetland-dependent and wetland-associated wildlife and endangered species is provided by the *Wildlife Act*. The designation of protected areas is another tool for the protection of wildlife and endangered species within these areas. Protected areas serve as a source of species for adjacent areas, maintaining productivity and biological diversity.

Objectives for Protection

- Water conservation objectives
- Transboundary agreements
- Instream needs

Knowledge and Understanding

- Lake level and flow monitoring
- Precipitation and temperature monitoring
- Snow pack monitoring
- Natural yield and flow modelling
- Watershed assessments
- Environmental impact assessments

Achieving Protection

- Water management plans
- Forest management plans
- *Water Act* (licences, Crown licences, reservations, holdbacks, approvals)
- *Public Lands Act*
- Codes of Practice (e.g. for the Temporary Diversion of Water for Hydrostatic Testing of Pipelines)
- Timber Harvest Planning and Operating Ground Rules
- Alberta Environment Compliance Assurance Program

Objectives for Protection

- Surface Water Quality Guidelines for Use in Alberta
- Canadian Environmental Quality Guidelines
- Water Conservation Objectives
- Temperature and dissolved oxygen criteria for Alberta fishes

Knowledge and Understanding

- Water quality monitoring
- Effluent monitoring
- Watershed assessments
- Nutrient budgets
- Compliance and trend analysis
- Water quality modelling
- Environmental impact assessments

Achieving Protection

- Water Management Plans
- Forest Management Plans
- *Water Act*
- *Environmental Protection and Enhancement Act*
- *Public Lands Act*
- *Fisheries Act (Canada)*
- *Municipal Government Act*
- Codes of Practices (e.g. for Responsible Livestock Development and Manure Management)
- Alberta Environment Compliance Assurance Program

Objectives for Protection

- Fish use allocation goals
- Fish conservation goals
- Species management goals

Knowledge and Understanding

- Population monitoring and assessment
- Fisheries stock assessments
- Biodiversity assessments
- Species Inventories
- Creel census/utilization surveys
- Breeding bird counts
- Traditional knowledge
- Environmental impact assessments

Achieving Protection

- Fish Conservation Strategy for Alberta
- Canadian Biodiversity Strategy
- Water Management Plans
- Fisheries Management Plans
- *Wildlife Act*
- *Water Act*
- *Fisheries Act (Canada)*
- Alberta Fisheries Regulations
- *Migratory Bird Convention Act*
- North American Waterfowl Management Plan
- Codes of Practice (e.g. for Watercourse Crossings)
- Alberta Environment Compliance Assurance Program

Objectives for Protection

- Fish habitat maintenance goal
- Instream needs
- Criteria for habitat development/enhancement
- Habitat quality indices

Knowledge and Understanding

- Instream needs methodologies
- Fish habitat inventories
- Land use surveys
- Alberta Vegetation Inventory
- Traditional knowledge
- Riparian Health Assessment
- Environmental Impact Assessment

Achieving Protection

- Water Management Plans
- Forest Management Plans
- Fisheries Management Plans
- Fish Conservation Strategy for Alberta
- *Canadian Environmental Protection Act*
- *Water Act*
- *Public Lands Act*
- *Migratory Birds Convention Act*
- *Fisheries Act (Canada)*
- Alberta's Wetland Policy
- Codes of Practice (e.g. for Pipelines and Telecommunication Lines Crossing a Water Body)
- Alberta Environment Compliance Assurance Program